AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1.   (Original)   Method for creating an irregular mesh description and an embedded geometric description in a computer graphics system, comprising:

receiving topological input data representing vertices and faces of the mesh,

creating a G-map representation of the topology of said mesh based on said input data,

associating coordinates in space with the vertices of said mesh, and

creating a geometric description from said mesh and said coordinates by creating a refined mesh based on said first mesh and said coordinates, using coordinates associated with the vertices of said refined mesh to compute control points, and using said control points to create surface patches associated with said first mesh.

2.   (Original)   Method according to claim 1, wherein said refined mesh is created by applying a mesh refinement algorithm, and where each patch of said first mesh is created as a surface spline associated with a quad of said first mesh.

3.   (Currently amended)   Method according to ~~one of the previous claims~~ claim 1 or 2, wherein the step of creating a G-map comprises the steps of creating a set of darts each associated with one vertex and one face of said first mesh; and creating a number of involutions that establish associations between pairs of darts so that an α_0 involution links two darts associated with adjacent vertices but the same face, creating an edge, an α_1 involution links two darts associated with the same vertex and the same

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face, and an α_2 involution links two darts associated with the same vertex but adjacent faces, linking two adjacent faces.

4.   (Currently amended)   Method according to ~~one of the previous claims~~ claim 3, wherein a local refinement of said first mesh is created by defining a second mesh corresponding with one or more quads of said first mesh, subdividing said quads of said first mesh into smaller quads of said second mesh and describing the topology of said second mesh with a second G-map representation.

5.   (Original)   Method according to claim 4, wherein said second G-map is linked to said first G-map through γ-links between darts on the different levels.

6.   (Original)   Computer system for creating an irregular mesh description and an embedded geometric description from input data, comprising:

input interface for receiving topological input data representing vertices and faces of the mesh,

processing means for creating a G-map representation of the topology of said mesh based on said input data and storing said representation in memory,

processing means for associating coordinates in space with the vertices of said mesh and storing said coordinates in memory,

processing means for creating a geometric description from said mesh and said coordinates, including processing means for creating a refined mesh based on said first mesh and said coordinates, using coordinates associated with the vertices of said refined mesh to compute control points, and using said control points to create surface patches associated with said first mesh and, and

output interface for outputting said geometric description for representation on a display.

7.   (Original)   Computer system according to claim 6, wherein said means for creating said refined mesh is capable of applying a mesh refinement algorithm, and of creating each patch of said first mesh as a surface spline associated with a quad of said first mesh.

8.   (Original)   Computer system according to claim 6 or 7, wherein said means for creating a G-map comprises means for creating a set of darts each associated with one vertex and one face of said first mesh; and means for creating a number of involutions that establish associations between pairs of darts so that an α_0 involution links two darts associated with adjacent vertices but the same face, creating an edge, an α_1 involution links two darts associated with the same vertex and the same face, and an α_2 involution links two darts associated with the same vertex but adjacent faces, linking two adjacent faces.

9.   (Currently amended)   Computer system according to one of the claims 6 to claim 8, further comprising processing means for creating a local refinement of said first mesh by defining a second mesh corresponding with one or more quads of said first mesh, subdividing said quads of said first mesh into smaller quads of said second mesh and describing the topology of said second mesh with a second G-map representation.

10.   (Original)   Computer system according to claim 9, further comprising means for creating a link between said second G-map and said first G-map through

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links between darts on the different levels and storing these links in memory in a way that is associated with one or both G-map.

11.   (Currently amended)   Computer system according to ~~one of the claims~~ claim 6 [[to 10]], wherein the various processing means comprises a combination of computer program instructions and general purpose hardware.

12.   (Original)   Computer system according to claim 11, wherein said computer program instructions are stored on a persistent memory device in said computer system.

13.   (Currently amended)   Computer program product comprising computer instructions that, when installed on a computer, makes said computer capable of performing the method of ~~one of the claims~~ claim 1 [[to 5]].

14.   (Original)   Computer program product according to claim 13, stored on a computer readable medium.

15.   (Original)   Computer program product according to claim 14, wherein said computer readable medium is a CD-ROM or DVD-ROM.

16.   (Original)   Computer program product according to claim 14, wherein said computer readable medium is a magnetic or magneto-optical storage medium.

17.   (Original)   Computer program product according to claim 13, carried on a propagated signal.

18.   (Currently amended)   Method for arranging data in order to describe an irregular mesh topology and an embedded geometric description comprising:

creating a first data structure of a first type representing a G-map representation of a topological mesh and containing an arbitrary number of references to a second type of data structure,

creating an arbitrary number of data structures of a second type representing darts of the G-map, containing references to three other data structures of said second type, said references representing α-involutions of the G-map representation, and three references to data structures of a third, a fourth and a fifth type, respectively,

creating an arbitrary number of data structures of a third type representing vertices of the G-map, containing a reference to a data structure of a sixth type,

creating an arbitrary number of data structures of a fourth type representing quads of the G-map, containing a reference to a data structure of a seventh type,

creating an arbitrary number of data structures of a fifth type representing faces of the G-map, containing a reference to a data structure of an eight type,

creating an arbitrary number of data structures of a sixth type, being or including a variable containing the coordinates of a point in three dimensional space associated with a vertex of said G-map,

creating an arbitrary number of data structures of a seventh type, containing a description of a geometrical patch associated with a quad of said G-map, and

creating an arbitrary number of data structures of an eight type, containing a variable representing the coordinates of a point in three dimensional space associated with a face of said G-map,

wherein the creation of said data structures of the fourth type further includes creating one variable representing a vertex of a second mesh derived from the

coordinates of the vertices of said first G-map mesh and one variable representing coefficients used for deriving said vertex of said second mesh from said coordinates of the vertices of said first G-map mesh, said variable representing a vertex of said second mesh and being available for computation of control points that will be used to create geometrical patches associated with said data structures of the seventh type.

19.   (Original)   Method according to claim 18, further comprising the creation of local refinement of said irregular mesh topology and said embedded geometric description by creating

a second data structure of said first type representing a second G-map representation of a refined topological mesh,

in at least some of the data structures of the second type referred to by said first data structure of the first type, a reference to a data structure of said second type referred to by said second data structure of said first type, thus creating a reference from said first G-map representation of a topological mesh to said second G-map representation of a refined topological mesh.

20.   (Currently amended)   Method according to claim 19, wherein at least some of the data structures of the second type ~~contains~~ contain references to two other data structures of said second type, one that is part of a G-map representation of a refined topological mesh and one that is part of a G-map representation of a coarser topological mesh.

21.   (Original)   Method according to claim 19 or 20, wherein the creation of data structures of the sixth type as part of the second G-map representation of a refined topological mesh includes storing, in the variable that is or is part of this data structure

of the sixth type, the value found in the variable representing a vertex of a second mesh in an associated data structure of the fourth type in said first G-map representation of a topological mesh.

22.   (Currently amended)   Method according to ~~one of the claims 18 - 21~~ claim 18, wherein at least some of the references contained in the data structures are empty due to incompleteness of one or more of the topological meshes.

23.   (Currently amended)   Method according to ~~one of the claims 18 - 22~~ claim 18, wherein some of said data structures are included as parts of a larger data structure.

24.   (Currently amended)   Method according to ~~one of the claims 18 - 23~~ claim 18; wherein at least some of the data structures are objects and at least some of the references are pointers.

25.   (Currently amended)   Method according to ~~one of the claims 18 - 24~~ claim 18, wherein the data structures of the third, fourth and fifth type are objects that inherit characteristics from a common class.

26.   (Currently amended)   Method according to ~~one of the claims 18 - 25~~ claim 18, wherein all created data structures are stored in a computer memory for access by a data processing system.